Combination of Rigid and Non-Rigid Fixation in Maxillary Orthognathic Surgery: Case Report

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Abstract: Every reduction requires fixation. The osteotomized segments are fixed with various techniques as described in the literature. Fixation is broadly classified into rigid and non-rigid. Non-rigid fixation is the old and gold technique which is still used by various surgeons. Rigid fixation has gained lot of attraction in the recent decades. All the budding surgeons prefer rigid fixation. Either of the one will be preferred choice of treatment, but we present here a case in which both non-rigid and rigid fixation techniques are used in the Le Fort I maxillary advancement orthognathic surgery and has provided excellent stability.

Keywords: Rigid fixation, Non-rigid fixation, Orthognathic surgery, Maxillary advancement, Stability.

INTRODUCTION

Maxillary orthognathic surgery especially Le Fort I orthognathic surgery is the most frequently used method to correct the retrognathic and prognathic maxilla [1-3]. Stability is the major issue which is considered post-operatively for proper function and occlusion [4]. Relapse is common complication noted [5-7]. Various techniques to achieve and improve stability has been documented. Yet, rigid fixation has taken over non-rigid fixation [8-10] Miniplate fixation is often preferred in maxillary advancement surgeries [11].

But, in superior repositioning some surgeons prefer non-rigid fixation too [12-14]. Numerous studies have investigated the horizontal and vertical stability after Le Fort I osteotomy [1-10] Surgeons have also use various natural and synthetic grafts during fixation [11-16]. Still the debate achievement of stability by rigid and non-rigid fixation is on go. We have used the combination technique and have achieved excellent stability. This case report briefs the same technique of fixation.

CASE REPORT

A 25-year-old male patient reported to us with a chief complaint of gummy smile. He also added that he is unable to close the lip during the normal time and also teeth show at rest. He was having a vertical maxillary excess with recessive chin, maxillary and mandibular dentoalveolar protrusion of anterior teeth and incompetent lips. (Figure 1) Cephalometric analysis revealed increased SNA and SNB angle, increased middle facial height, increased inclination of maxillary and mandibular teeth and decreased interincisal angle. (Figure 2) Clinico-radiographically the diagnosis was confirmed as vertical maxillary excess. Treatment was planned for pre-operative orthodontics followed by orthognathic surgery and end with post-operative orthodontia. Pre-operative alignment of both the arches was done NiTi and stainless-steel wires. (Figure 3, 4, 5) Overjet and overbite of 6 mm was present. (Figure 6) Le Fort I superior impaction, anterior maxillary osteotomy and mandibular sub apical osteotomy under general anesthesia was performed. Wiring (non-rigid fixation) was done on the zygomatic buttress and miniplate (rigid) fixation was done on pyriform region bilaterally maintaining the trajectories of forces and fixing the appropriate vertical and horizontal buttresses to achieve better stability. Excepted stability was achieved with this type of combination technique. (Figure 7, 8) Occlusion was achieved with molar relation intraoperatively. (Figure 9, 10) Overjet and overbite was achieved normal (Figure 11).
Fig-4: Pre-Operative Occlusion Right Side

Fig-5: Pre-Operative Occlusion Left Side

Fig-6: Pre-Operative Overjet and Overbite

Fig-7: Fixation Left side
Fig-8: Fixation Right Side

Fig-9: Post-Operative Occlusion Right Side

Fig-10: Post-Operative Occlusion Left Side

Fig-11: Post-Operative corrected overjet and overbite
DISCUSSION

The restoration of normal jaw function, optimal facial aesthetics, and long-term stability are the goals of successful orthognathic surgery [4]. The Le Fort I osteotomy with impaction is a common orthognathic procedure used in the correction of maxillary deformities. Critical analysis of long-term stability of the osteotomies has been lacking in literature [7]. A number of studies on the Le Fort I osteotomy have shown that, in general, the procedure is stable[3-10]. However, situations that has historically proven problematic for intraoperative stabilization and postoperative stability include inferior repositioning, advancement and superior repositioning when bone contact is poor or thin. Conversely, superior repositioning has been reported as a stable movement. A quantitative assessment of the immediate postsurgical changes after a 1-piece Le Fort I osteotomy with impaction with either anterior or posterior repositioning still required investigation. The anterior maxilla moves superiorly more than twice as much as the posterior maxilla. This continued superior movement post-surgically was resorption and remodeling occurring at the surgical site and the “telescoping effect” that sometimes results from superior maxillary repositioning. Another likely cause was periodic tightening of the suspension wires during fixation. Many minor and sometimes major discrepancies in maxillary position were not seen until release of fixation. Rigid fixation caused early variance from the desired position. Researchers have compared patients treated with wire osteosynthesis and rigid internal fixation after Le Fort I advancement. They found no statistical difference in postoperative movement between the 2 groups in the horizontal plane, although comparison of mean values suggested improved stability with rigid fixation. In the vertical plane, there was a statistically significant, although minimal, improvement in stability with rigid internal fixation versus wire osteosynthesis[17]. Louis et al. studied postoperative relapse versus the amount of maxillary advancement in a group of sleep apnea patients who underwent bimaxillary surgery. They noted slightly increasing relapse with increasing amounts of maxillary advancement. However, these differences were not statistically significant [18]. Many investigations have been fraught with problems of study design and heterogeneity of the sample. Critical, quantitative evaluation of the stability of this technique remains limited. In this dilemma of rigid and non-rigid fixation we have used both in conjunction by using rigid fixation in pyriform and non-rigid in posterior buttress region and have achieved a remarkable stability.

CONCLUSION

Rigid fixation methods offer advantages over wire osteosynthesis methods that require MMF. The increased convenience and decreased anxiety with not having MMF may be a more important consideration in choosing rigid fixation than is potential enhancement in stability. Further data must be collected and analyzed to provide a statistically significant statement as to which method of fixation is superior on the basis of postoperative stability. Improved ability to accurately predict the relapse of Le Fort I osteotomies will enable surgeons and orthodontists to better plan their procedures and, if necessary, to include the appropriate amount of overcorrection into the treatment plan.

REFERENCES


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793